

AMENDMENTS TO THE DRAWINGS

Replacement formal drawings of Figures 1-18 are submitted concurrently herewith under a separate cover letter.

REMARKS

By this Amendment, claims 1, 3, 7-11 and 20-25 are amended. Claims 4 and 6 remain in the application.

In 1 on page 2 of the Office Action, claims 2, 5, 12-17 and 20 were withdrawn from consideration based on the Applicants' election of Species I depicted in Figures 1-14, 15A, 15B, 16A and 16B. Therefore, claims 1, 3, 7-11 and 21-25 are active in the application. Reexamination and reconsideration of the application are respectfully requested.

I. Replacement Formal Drawings

In item 2 on pages 2-3 of the Office Action, the drawings were objected to for including reference numerals not mentioned in the specification, and for containing spelling errors. Replacement formal drawings of Figures 1-18 are submitted concurrently herewith under a separate cover letter to correct the informalities identified in item 3(a)-(d) of the Office Action. However, reference numeral 58 has not been removed from Figure 18. Instead, reference numeral 58 has been added to the specification in order to denote the flat coil of the voice coil motor as corresponding to reference numeral 58 (see line 25 on page 14 of the substitute specification). Accordingly, by adding reference numeral 58 to the specification, it was unnecessary to delete reference numeral 58 from Figure 18.

For the Examiner's convenience, the Applicants also submit annotated marked-up drawings of Figures 1-2, 4, 10, 13B-13C and 14 to illustrate the revisions made thereto in the replacement formal drawings of Figures 1-18.

No new matter has been added to the drawings. Accordingly, approval of the replacement formal drawings is respectfully requested.

II. Substitute Specification and Abstract

The specification and abstract have been carefully reviewed and revised in order to correct grammatical and idiomatic errors in order to aid the Examiner in further consideration of the application, and to overcome the informalities of the specification as identified in item 5(a) on page 4 of the Office Action. The amendments to the

specification and abstract are incorporated in the attached substitute specification and abstract. No new matter has been added.

Also attached hereto is a marked-up version of the substitute specification and abstract illustrating the changes made to the original specification and abstract.

III. Objection to the Title of the Invention

In item 4 on page 3 of the Office Action, the Examiner objected to the title of the invention as not being descriptive, even though the claims of the present application are clearly directed to a piezoelectric actuator and a disk drive using the piezoelectric actuator. Nevertheless, in view of the Examiner's objection to the title, the title has been revised to "Piezoelectric Actuator and Disk Drive Apparatus Using the Piezoelectric Actuator." The Applicants respectfully submit that the revised title of the invention is clearly indicative of the invention to which the claims are directed. Therefore, the Applicants respectfully request approval of the revised title.

IV. Objection to the Claims

In items 5(b)-(e) on page 4 of the Office Action, the Examiner objected to claims 8-11, 18-19 and 21-25 because of the identified informalities. Claims 8-11, 18-19 and 21-25 have each been amended to include the revisions kindly suggested by the Examiner. Accordingly, in view of the amendments to claims 8-11, 18-19 and 21-25, the Applicants respectfully request that the objection to the claims be withdrawn.

V. Art Rejections

In item 7 on page 5 of the Office Action, claims 1, 3, 7 and 9 were rejected under 35 U.S.C. § 102(b) as being anticipated by Takeuchi et al. (U.S. Patent Application Publication No. 2002/0017014, hereinafter "Takeuchi").

In item 8 on page 5 of the Office Action, claims 1, 8-9, 11 and 23-24 were rejected under 35 U.S.C. § 102(b) as being anticipated by Inagaki et al. (U.S. Patent Application publication No. 2002/0012194, hereinafter "Inagaki").

In item 9 on page 6 of the Office Action, claims 1, 4, 6, 8-11, 19, 21 and 23-25 were rejected under 35 U.S.C. § 102(b) as being anticipated by Kuwajima et al. (U.S. Patent Application Publication No. 2001/0021086, hereinafter “Kuwajima I”).

In item 10 on page 8 of the Office Action, claims 1, 8-11 and 23-25 were rejected under 35 U.S.C. § 102(e) as being anticipated by Kuwajima et al. (U.S. Patent Application Publication No. 2004/0114279, hereinafter “Kuwajima II”).

Without intending to acquiesce to these rejections, independent claim 1 has been amended to more clearly illustrate the marked differences between the present invention and the applied references. Accordingly, the Applicants respectfully submit that the present invention is patentable over the applied references for the following reasons.

Initially, the Applicants note that the filing date of the Kuwajima II reference is July 29, 2003, which is after the filing date of the foreign priority application of the present application. The present application claims priority under 35 U.S.C. § 119 to Japanese Patent Application No. 2002-301604, filed October 16, 2002.

A verified English language translation of the foreign priority document is submitted concurrently herewith under a separate cover letter. The foreign priority document fully supports the claims of the present application, including claims 1, 8-11 and 23-25 which were rejected as being anticipated by Kuwajima II.

Accordingly, since the foreign priority document of the present invention supports the claims of the present application, the present invention has an effective filing date of October 16, 2002, which is before the filing date of Kuwajima II. Therefore, Kuwajima II, by having a filing date after the foreign priority date of the present invention, cannot constitute prior art against the present application. As a result, the rejection of claims 1, 8-11 and 23-25 as being anticipated by Kuwajima is traversed and must be withdrawn.

The Applicants respectfully submit that the present invention is clearly patentable over Takeuchi, Inagaki and Kuwajima I for the following reasons.

The present invention provides a piezoelectric actuator comprising a flexible substrate separated by a split so as to form two separate flexible substrates in a same plane. The two flexible substrates comprise a first flexible substrate and a second flexible substrate.

The piezoelectric actuator of the present invention also comprises a first piezoelectric element unit 10a and a second piezoelectric element unit 10b. As shown in Figure 8, for example, both the first and second piezoelectric element units 10a and 10b are in the same plane. In particular, the present invention provides that first piezoelectric element unit 10a is disposed on the first flexible substrate, and the second piezoelectric element unit 10b is disposed on the second flexible substrate approximately in parallel with the first piezoelectric element unit 10a such that the first and second piezoelectric element units are separated from each other by the slit.

The piezoelectric actuator of the present invention also comprises a coupling portion 40. As described in line 14 on page 12 to line 3 on page 13 of the substitute specification (line 27 on page 11 to line 16 on page 12 of the original specification) and as illustrated in Figure 15A of the present application, if no coupling portion is provided, one of the piezoelectric element units 10a, 10b will be bend upwards, and the other piezoelectric element unit 10a, 10b will bend downwards in the opposite direction (see arrows A and B in Figure 15A). This creates an unstable phenomenon due to resonance of actuator elements that occurs in lows frequencies, as shown by Point C in Figure 15B.

To prevent such an unstable phenomenon, the piezoelectric actuator of the present invention comprises the coupling portion 40 which is operable to couple the separated first and second flexible substrates across the slit and to suppress a way resonance phenomenon of the flexible substrate. As described in line 4 on page 13 to line 8 on page 14 of the substitute specification (line 17 on page 12 to line 21 on page 13 of the original specification) and as illustrated in Figures 16A-B, by providing the coupling portion 40 across the slit to couple the first and second flexible substrates that are separated by the slit, the piezoelectric element units 10a and 10b extend and contract in a same plane, thereby causing no losses and out-of-alignment generated by an extension/contraction movement. Consequently, by the arrangement of the coupling portion 40 of the present invention, the coupling portion suppresses a wavy resonance phenomenon of the flexible substrate.

Claim 1 of the present invention recites the above-described features of the present invention.

On the other hand, the piezoelectric actuator of Takeuchi includes piezoelectric units 2 that face each other. Accordingly, the piezoelectric units 2 of Takeuchi are clearly not disclosed or suggested as being provided in the same plane, in stark contrast to claim 1.

Furthermore, Takeuchi clearly does not disclose or suggest a coupling portion operable to couple the separated first and second flexible substrates across the slit and to suppress a wavy resonance phenomenon of the flexible substrate, as recited in claim 1. This arrangement is simply not possible in Takeuchi due to the arrangement of the piezoelectric units 2 facing each other.

Accordingly, Takeuchi clearly does not disclose or suggest each and every limitation of claim 1.

Similarly, neither Inagaki nor Kuwajima I disclose or suggest a coupling portion operable to couple the separated first and second flexible substrates across the slit and to suppress a wavy resonance phenomenon of the flexible substrate, where the first and second flexible substrates are separated from each other in a same plane, and where a second piezoelectric element unit is disposed on the second flexible substrate approximately in parallel with the first piezoelectric element unit such that the first and second piezoelectric element units are separated from each other by the slit, as recited in claim 1.

Accordingly, none of the references applied by the Examiner disclose or suggest each and every limitation of claim 1. Therefore, the Applicants respectfully submit that claim 1 is clearly not anticipated by either Takeuchi, Inagaki or Kuwajima I.

Furthermore, in view of the clear distinctions discussed above, no obvious combination of Takeuchi, Inagaki and Kuwajima I would result in the invention of claim 1 since Takeuchi, Inagaki and Kuwajima I, either individually or in combination, disclose or suggest each and every limitation of claim 1.

Therefore, the Applicants respectfully submit that claim 1 is clearly patentable over Takeuchi, Inagaki and Kuwajima I.

Furthermore, the Applicants respectfully submit that Takeuchi, Inagaki and Kuwajima I clearly do not disclose or suggest that the coupling portion as recited in claim 1 is further:

- (1) provided at a position corresponding to an antinode of a primary bending mode of the first piezoelectric element unit and the second piezoelectric element unit each being fixed at both ends thereof, respectively, as recited in claim 3;
- (2) composed of a wiring material provided on the flexible substrate, as recited in claim 4; and
- (3) provided across the separated first and second flexible substrates, and the thickness of the coupling portion is larger than the width of the coupling portion, as recited in claim 7.

Therefore, for at least the foregoing reasons, the Applicants respectfully submit that the inventions of claims 1, 3-4 and 7 are clearly not disclosed or suggested by Takeuchi, Inagaki and Kuwajima I.

Because of the clear distinctions discussed above, it is submitted that the teachings of Takeuchi, Inagaki and Kuwajima I clearly do not meet each and every limitation of claim 1, as well as claims 3-11 and 18-25 which depend therefrom.

Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time the invention was made would not have been motivated to modify Takeuchi, Inagaki and Kuwajima I in such a manner as to result in, or otherwise render obvious, the present invention as recited in claim 1, as well as claims 3-11 and 18-25 which depend therefrom.

Therefore, it is submitted that the claim 1, as well as claims 3-11 and 18-25 which depend therefrom, are clearly allowable over the prior art as applied by the Examiner.

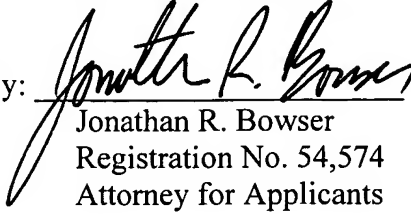
In view of the foregoing amendments and remarks, it is respectfully submitted that the present application is clearly in condition for allowance. An early notice thereof is respectfully solicited.

If, after reviewing this Amendment, the Examiner feels there are any issues remaining which must be resolved before the application can be passed to issue, the Examiner is respectfully requested to contact the undersigned by telephone in order to resolve such issues.

A fee and a Petition for a one-month Extension of Time are filed herewith pursuant to 37 CFR § 1.136(a).

Respectfully submitted,

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